

gether uniform, particularly as regards the comparative resistance of animals kept in the sunlight and those kept in the dark. It sometimes happened that the latter animals withstood higher doses of toxin than the former. Certain conflicting results the authors believe may be accounted for by the rapidity and method of absorption of the toxins. They suggest that further experiments may elucidate some of the obscure points.

FLEXNER and NAGUCHI (*Jour. Exp. Med.*, 1906, vol. viii. p. 1) in their studies of the effects of eosin upon tetanus toxin have made other interesting observations. Ehrlich has shown that tetanus toxin is composed of two poisons—the hæmolysin, tetanolysin, and the convulsive body, tetanospasmin. The authors find that an eosin strength of 0.13 per cent. quickly destroys the tetanolysin in the dark, while in the light the destructive action of eosin is exceedingly rapid, even in quantities small enough to be inactive in the dark. Moreover, simple exposure of tetanus toxin in test tubes to sunlight for six hours completely destroys the lysin. The tetanospasmin was quickly destroyed, in the dark, by solutions of eosin exceeding 1 per cent. in strength, and 0.6 per cent. solution reduces greatly the activity of the poison. Simultaneous injections of eosin and tetanus toxin in rats, when made in the same situation, or, as in one instance, in different places, delayed the onset of symptoms and prolonged life, but did not save the animals. Experiments made with tetanus spores instead of toxin yielded much the same results. In rats, injections of eosin at the site of inoculation of the spores delayed the onset of tetanus symptoms or wholly suppressed their development. In the more highly sensitive guinea-pigs tetanic symptoms may be restrained, provided the eosin is brought into close relationship with the developing tetanus poison before it is fixed by the nervous tissues or enters the general circulation.

Experimental Investigation of the Action of the X-ray upon the Bone-marrow.—HEINEKE (*Deut. Zeit. f. Chir.*, 1905, Bd. lxxviii. p. 196) in an earlier paper (*Mit. aus der Grenz. der. Med. u. Chir.*, 1904, Bd. xiv.) has described a destructive action of the x-ray upon the lymphoid tissues, especially the lymph glands and spleen of guinea-pigs. This consisted in practically complete destruction of the lymphoid tissues with later regeneration. He believes the x-ray had a selective action for these tissues. The present paper is a sequel to the first. One series of guinea-pigs was x-rayed for from two to ten hours and the marrow from the tibia, femur and humerus examined immediately after the completion of the exposure. In another series eight guinea-pigs were exposed for fifteen hours and the marrow examined in from eighteen to a hundred and fifty hours after the beginning of the exposure, while in a third series twelve guinea-pigs were x-rayed for ten hours and the marrows examined three to fifty-three days later.

The first changes in the marrow cells occurred two and one-half to three hours after exposure to the x-ray. These changes consisted in shrinking and deep staining of the nuclei of the cells with the formation of chromatin balls. Of the various types of cells the lymphocytes suffered first, next the granular and non-granular myelocytes, later the eosinophiles and cells, and finally the polymorphonuclear neutrophiles. All the white cells of the marrow were finally affected, including the multinucleated giant cells. In from ten to twelve hours this nuclear

distribution reached its height and many phagocytes made their appearance. Later the nuclear debris disappeared entirely and the marrow appeared greatly impoverished in cells. The maximum point of cellular depletion was noted five to six days after exposure to the α -ray. At this time only a few cells, principally polymorphonuclear leukocytes, were scattered here and there in an indifferent ground substance. An exposure of three to four hours to the α -ray was sufficient to produce great cellular destruction in the marrow, while after ten hours' treatment almost all the marrow cells disappeared by the fifth or sixth day. Only about one half the animals survived, however, after this prolonged exposure. After twelve to fourteen days regeneration of the marrow cells began. The lymphocytes, non-granular cells and giant cells reappeared first, while the eosinophiles and cells were slow to regenerate. At two and one-half to three weeks regeneration was at its height, and by this time the marrow seemed even more cellular than normal marrow. By four weeks the process of restitution was completed.

In the light of these experiments the author discusses the α -ray treatment of leukæmia, pseudoleukæmia, and sarcoma. The disappearance of the pseudoleukæmic tumors depends upon their cellular nature. If the tumors are cellular they disappear rapidly under the α -ray treatment, but if they are fibrous the treatment has little effect upon their size. To illustrate this the author describes two cases showing the results of α -ray treatment upon the two forms of pseudoleukæmia. In all these conditions the improvement is only transitory for the tissues affected are capable of regeneration.

Eosinophilia in Experimental Trichinosis.—STAUBLI (*Deut. Arch. f. klin. Med.*, 1906, Bd. lxxxv. p. 286) reports seven cases of trichinosis in all of which there was a considerable increase in the eosinophile leukocytes of the circulating blood, while in four of the severest cases there was a hyperleukocytosis. Further studies of the blood and series of differential counts showed that there were alterations in the number and percentage of lymphocytes. During the early part of the infection a decrease was noted, but later there was a continual increase in the number of lymphocytes. Early in the infection there is polycythæmia, later a mild grade of anæmia. The urine showed constantly a diazo reaction. During secondary bacterial infections the eosinophiles suffer a marked decrease. In fatal cases the eosinophiles may disappear from the blood. Interesting experiments were made upon guinea-pigs which were infected by feeding trichinæ. As in man, so in the guinea-pig, marked eosinophilia follows infection by trichinæ. This is not comparable to the eosinophilia seen in helminthiasis, for no accumulation of eosinophiles occurred in the mucosa of the gastrointestinal tract. The general eosinophilia did not develop until eight to ten days after infection. This time coincided with the migration of the embryos through the lymphatics of the mesentery to the mesenteric lymph glands. From the mucosa of the intestines the embryos reach the mesenteric lymphatics, through which they pass to the thoracic duct. By this means they are carried to the general circulation, where the author has been able to demonstrate them in considerable numbers. Finally, the embryos reach the muscles. A local formation of eosinophiles about the parasites in the muscles could not be demonstrated. The general eosinophilia is regarded as a reaction dependent upon certain substances which appear in the blood